



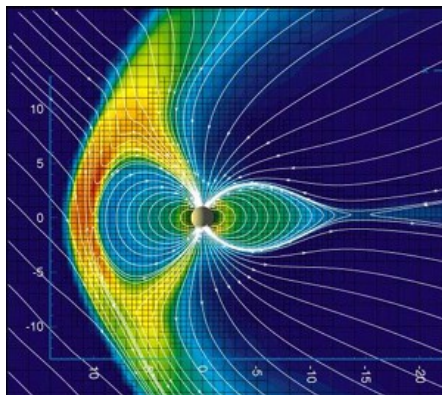
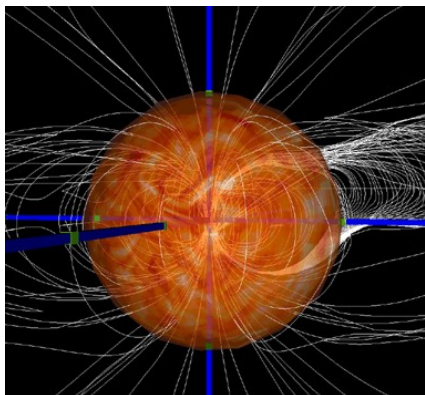
MURI 01

Comprehensive Solar-Terrestrial Environment Model for Space Weather Predictions

University of Michigan



25 SEP 01



Coronal Mass Ejections (CMEs) create geomagnetic storms at Earth, damaging satellites & disrupting C4ISR

Approach:

- Construct realistic numerical simulations of solar magnetohydrodynamics (MHD) to describe the interplanetary propagation of CMEs from the Sun to the Earth and SEP creation and acceleration;
- Combine ground- and space-based observations & data assimilation techniques with robust “plug and play” modular software for flexible MHD modeling.

Objectives:

- Provide warning that a solar magnetic eruption (CME or flare) is imminent and when it will occur;
- Predict whether solar eruptions will propagate to the Earth's space environment;
- Provide accurate forecasts of Solar Energetic Particle (SEP) bombardment,

radiation belt enhancements, and geomagnetic storms.

Applications:

- Mitigation techniques for spacecraft protection and design parameters for more robust components;
- Operational space weather warnings and forecasts to prepare for communication/navigation outages, power grid disruptions, and spacecraft anomalies;
- Space situational awareness for tactical and strategic planning during military operations.